Sequences do <u>not</u> have to be arithmetic (or geometric)

Example.

explicit formula

$$a_n = n^2 - 5n$$

terms:

$(n=1)$ $a_1 = 1^2 - 5 \cdot 1 = -4$

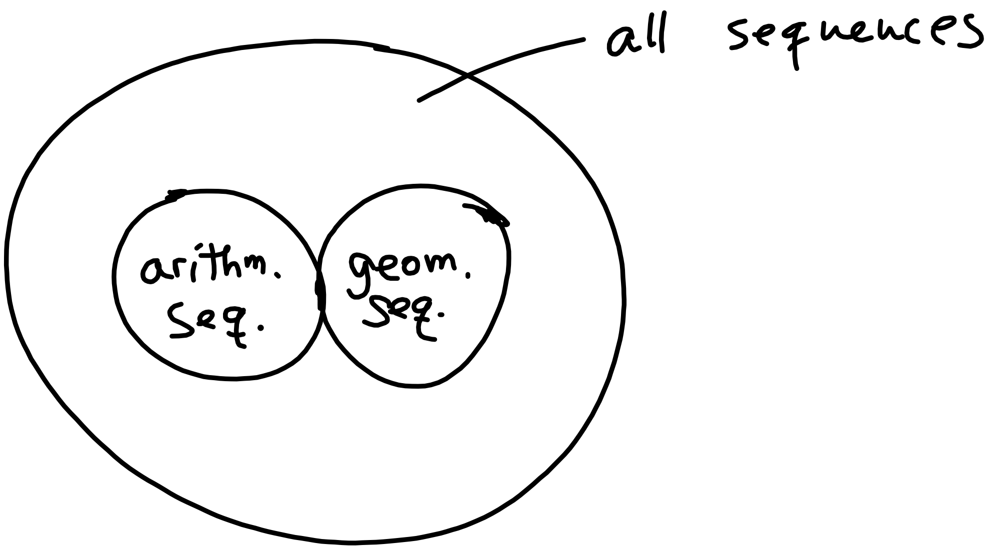
$(n=2)$ $a_2 = 2^2 - 5 \cdot 2 = -6$

$(n=3)$ $a_3 = 3^2 - 5 \cdot 3 = -6$

$(n=4)$ $a_4 = 4^2 - 5 \cdot 4 = -4$

$(n=5)$ $a_5 = 5^2 - 5 \cdot 5 = 0$

$-4, -6, -6, -4, 0, \ldots$



Recursive definition:

① first term given

example: $a_1 = 6$

② formula (recipe) for finding term a_n when you know term a_{n-1}

$$a_n = 2 \cdot a_{n-1} - n$$

Important!

a_{n-1} is not the same as $a_n - 1$

$(n-1)^{\underline{th}}$ term

1 less than the $n^{\underline{th}}$ term

working out example:

$a_1 = 6$

$a_n = 2 \cdot a_{n-1} - n$

$n=1$: $a_1 = 6$

$n=2$: $a_n = 2 \cdot a_{n-1} - n$

$a_2 = 2 \cdot a_1 - 2$

$= 2 \cdot 6 - 2 = 10$

with recursive definition, the only term you can get, knowing a_{n-1} is a_n.

$n=3$: $a_n = 2 \cdot a_{n-1} - n$

$a_3 = 2 \cdot a_{3-1} - 3$

$= 2 \cdot a_2 - 3$

$= 2 \cdot 10 - 3 = 17$

$\vdots$

Formula for arithmetic sequence:

$$a_n = a_1 + (n-1) \cdot d$$

where: a_1 = 1st term

d = common difference